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LATHAM & WATKINS

PAUL R. WATKINS (1899-1973)
DANA LATHAM (1898-1974)

CHICAGO OFFICE
SEARS TOWER, SUITE 5800
CHICAGO, ILLINOIS 60606
TELEPHONE (312) 876-7700
FAX (312) 993-9767

LONDON OFFICE
ONE ANGEL COURT
LONDON EC2R 7HJ ENGLAND
TELEPHONE + 44-171-374 4444
FAX + 44-171-374 4460

LOS ANGELES OFFICE
633 WEST FIFTH STREET, SUITE 4000
LOS ANGELES, CALIFORNIA 90071-2007
TELEPHONE (213) 485-1234
FAX (213) 891-8763

MOSCOW OFFICE
113/1 LENINSKY PROSPECT, SUITE C200
MOSCOW 117198 RUSSIA
TELEPHONE + 7-503 956-5555
FAX + 7-503 956-5556

ATTORNEYS AT LAW
1001 PENNSYLVANIA AVE., N.W., SUITE 1300
WASHINGTON, D.C. 20004-2505
TELEPHONE (202) 637-2200
FAX (202) 637-2201
TLX 590775
ELN 62793269

NEW JERSEY OFFICE
ONE NEWARK CENTER
NEWARK, NEW JERSEY 07101-3174
TELEPHONE (201) 639-1234
FAX (201) 639-7298

NEW YORK OFFICE
885 THIRD AVENUE, SUITE 1000
NEW YORK, NEW YORK 10022-4802
TELEPHONE (212) 906-1200
FAX (212) 751-4864

ORANGE COUNTY OFFICE
650 TOWN CENTER DRIVE, SUITE 2000
COSTA MESA, CALIFORNIA 92626-1925
TELEPHONE (714) 540-1235
FAX (714) 755-8290

SAN DIEGO OFFICE
701 "B" STREET, SUITE 2100
SAN DIEGO, CALIFORNIA 92101-8197
TELEPHONE (619) 236-1234
FAX (619) 696-7419

SAN FRANCISCO OFFICE
505 MONTGOMERY STREET, SUITE 1900
SAN FRANCISCO, CALIFORNIA 94111-2562
TELEPHONE (415) 391-0600
FAX (415) 395-8095

June 9, 1995

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BY HAND DELIVERY

William F. Caton
Acting Secretary
Federal Communications Commission
1919 M Street, N.W.
Room 222
Washington, D.C. 20554

RECEIVED
JUN - 9 1995
FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF SECRETARY

Re: Automatic Vehicle Monitoring Systems
PR Docket No. 93-61; Ex Parte Presentation

Dear Mr. Caton:

This letter is to advise you that on June 8, 1995, Peter Shloss of Hughes Transportation Management Systems ("Hughes") and Raymond B. Grochowski of this office met with B.C. Jackson, Jr. of the Commercial Radio Division, Wireless Telecommunications Bureau, to discuss Hughes' request that the Commission reconsider the rule, adopted in the above-captioned docket, applying a frequency tolerance to non-multilateration Location and Monitoring Service ("LMS") systems. Hughes' request is set forth and discussed in the following filings in the above-captioned docket: its Petition for Reconsideration, filed April 24, 1995, its Opposition to Petition for Reconsideration, filed May 25, 1995, and its Reply to Oppositions to Petitions for Reconsideration, filed June 5, 1995. At the meeting, Hughes representatives provided Mr. Jackson a copy of the materials attached hereto, and referred to the materials during the discussion. In addition, Mr. Shloss brought a mobile transponder device typical of those used in Hughes' Vehicle to Roadside LMS system to the meeting, which was examined by Mr. Jackson.

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List A B C D E

Please contact the undersigned if there are any questions regarding this matter.

Respectfully submitted,

Raymond B. Grochowski
of LATHAM & WATKINS

A Common Need in All IVHS Disciplines:

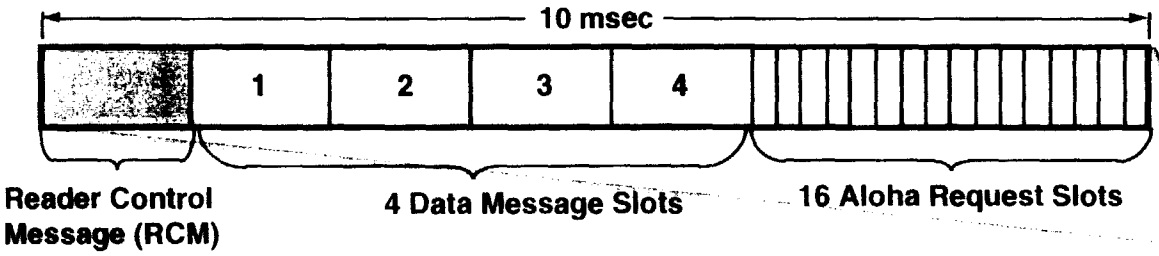
Vehicle - Roadside Communications (VRC)

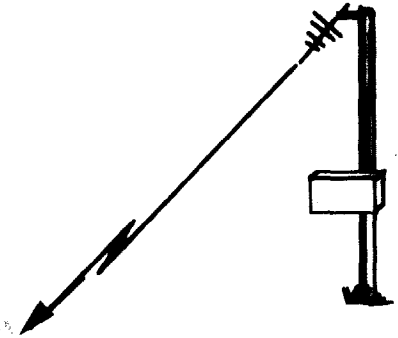
Two-Way Communications Between Road Infrastructure and Passing Vehicles

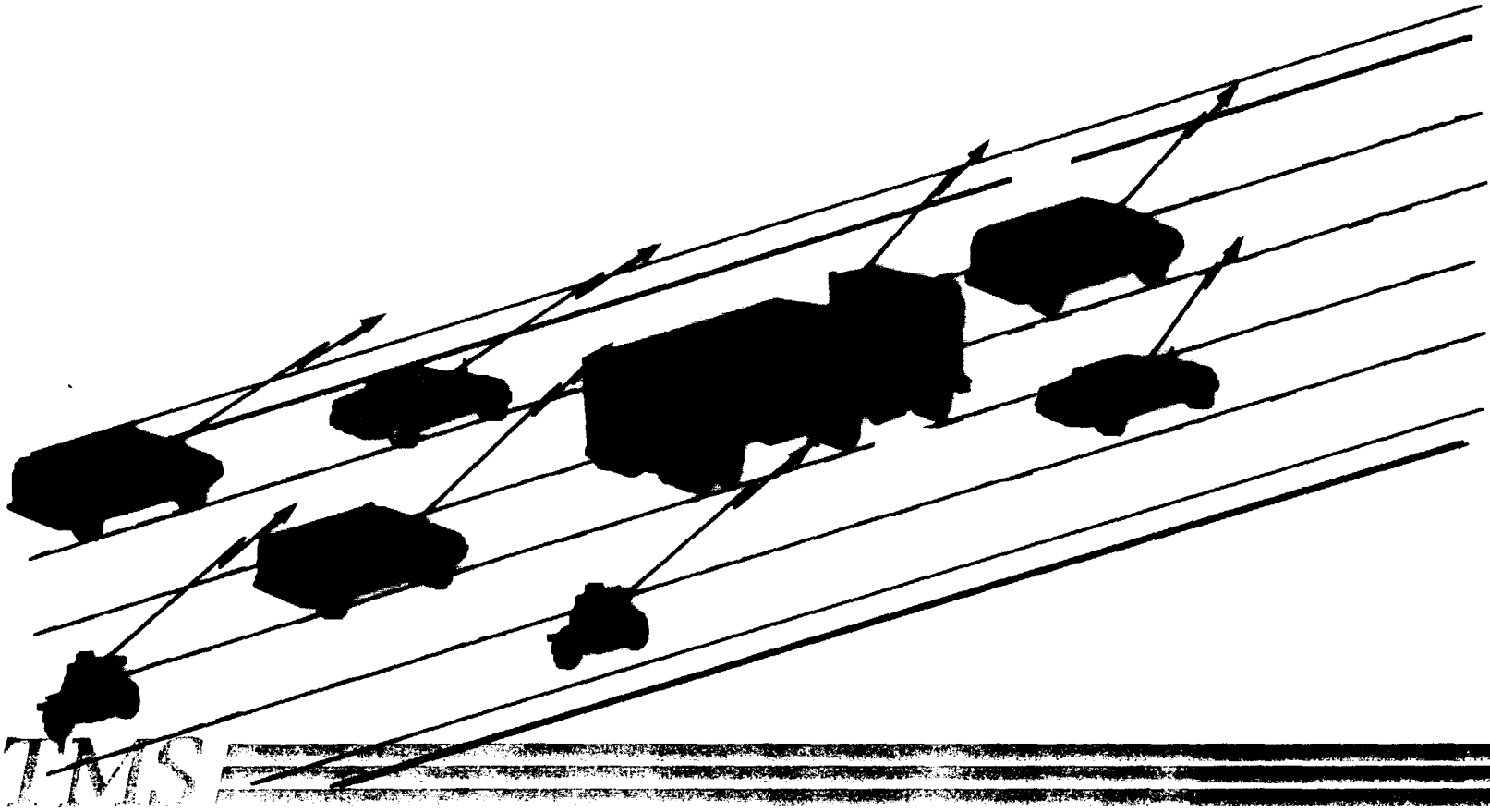
HTMS

Multiple, Concurrent Two-way Communications

FRAME STRUCTURE

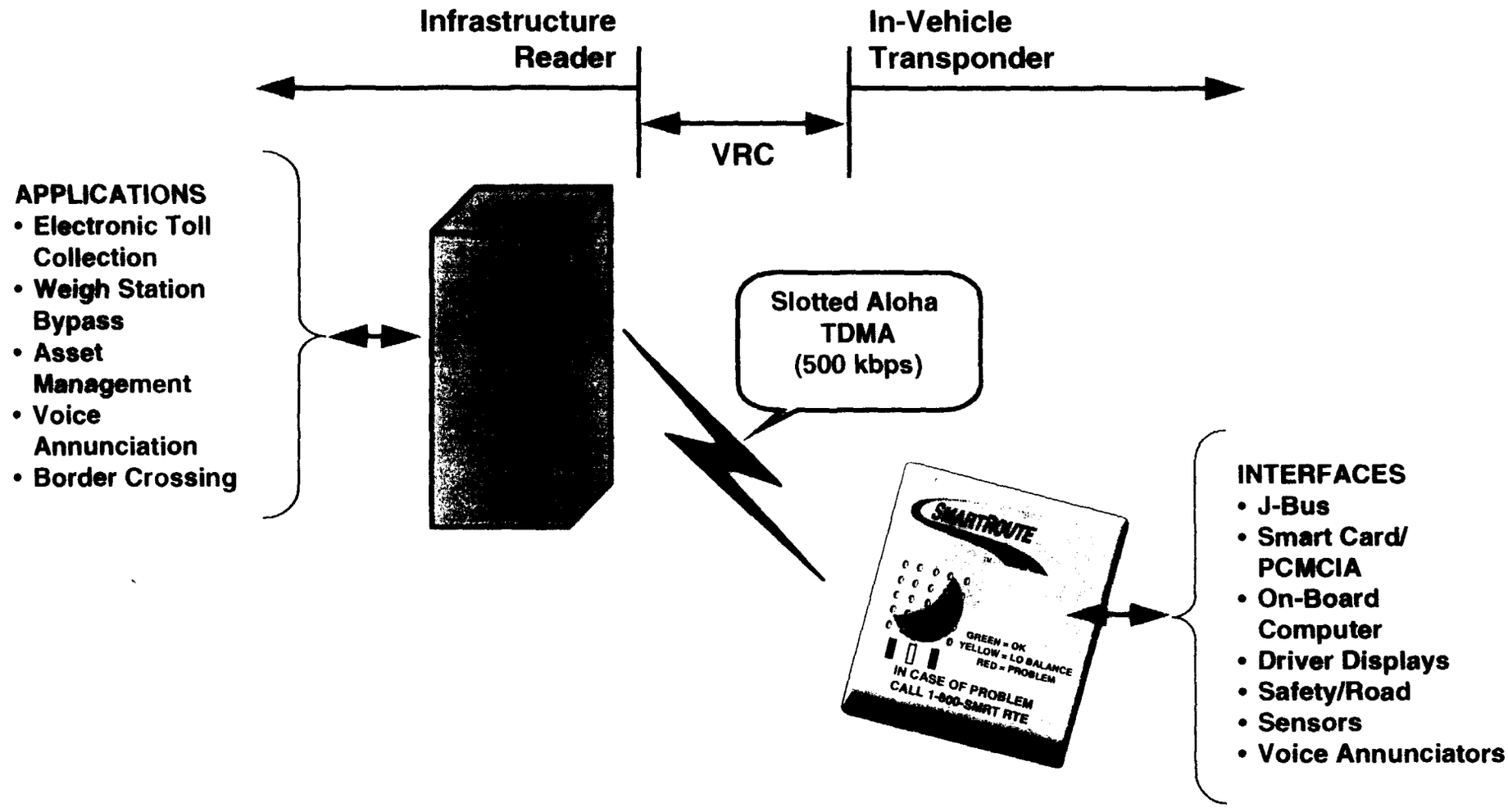






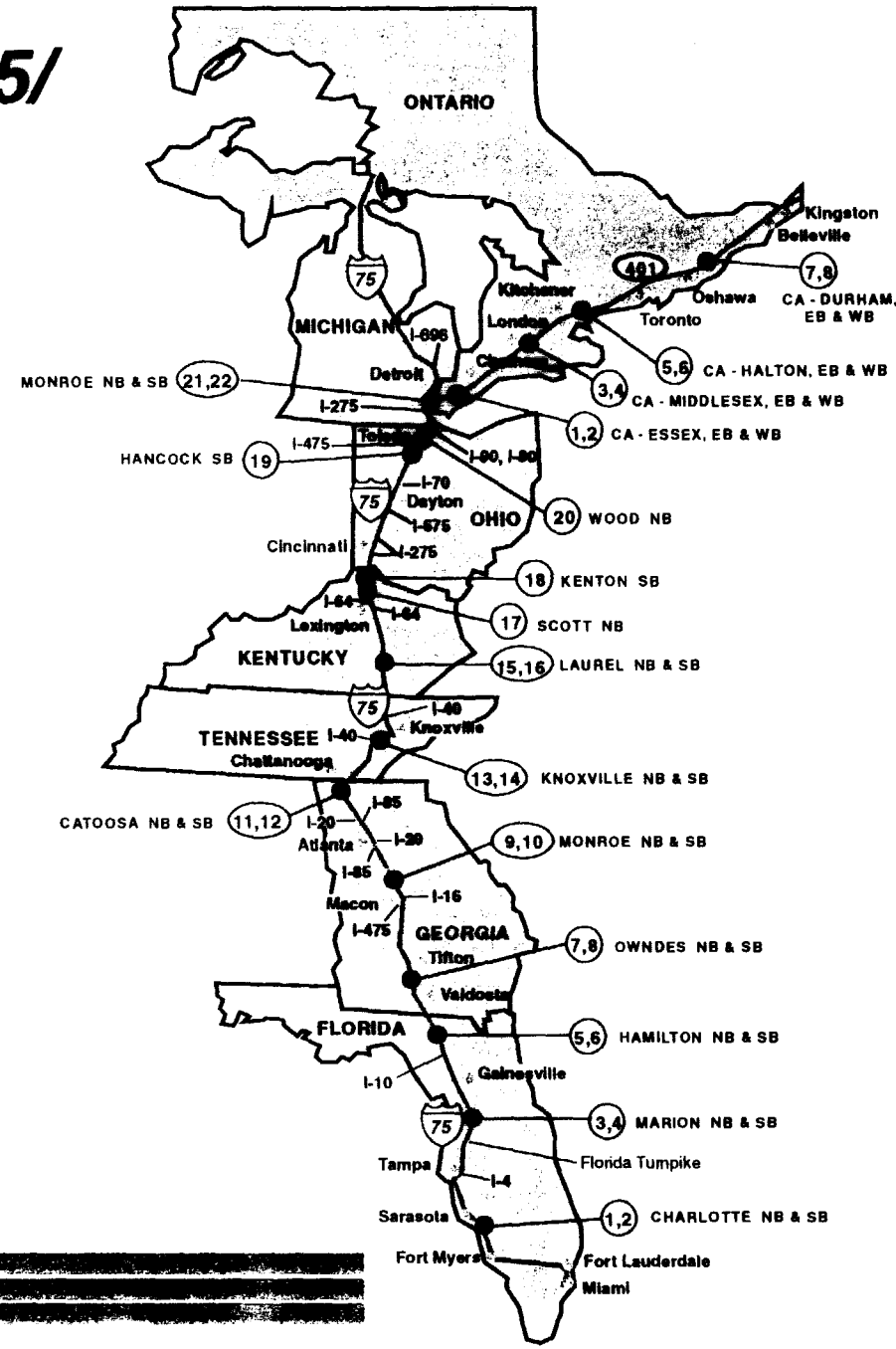
HTMS

System Architecture - The Big Picture



Advantage I-75/ AVION

Automated weigh station bypass on the 2,000 mile US I-75 and Ontario H-401 corridor



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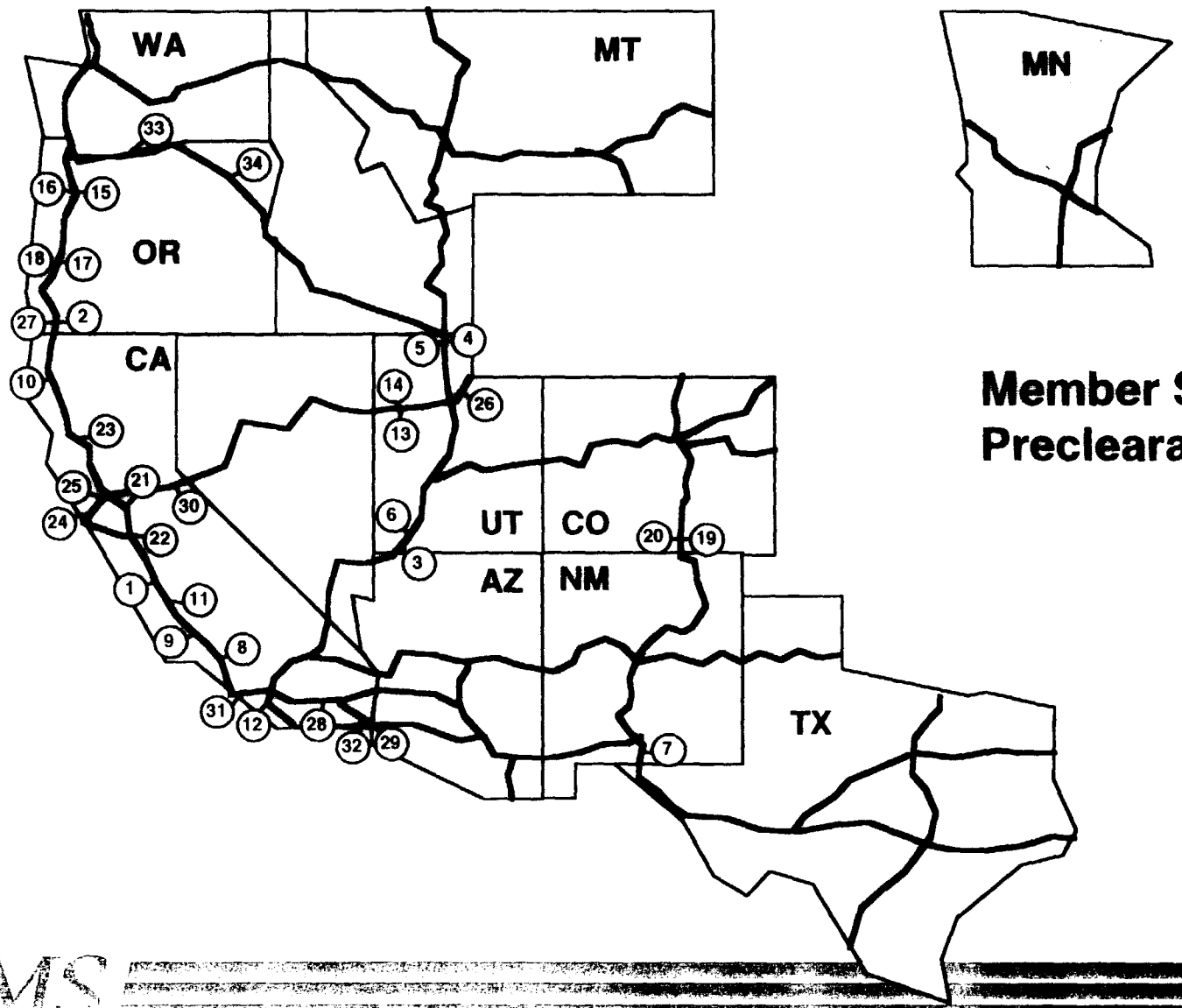
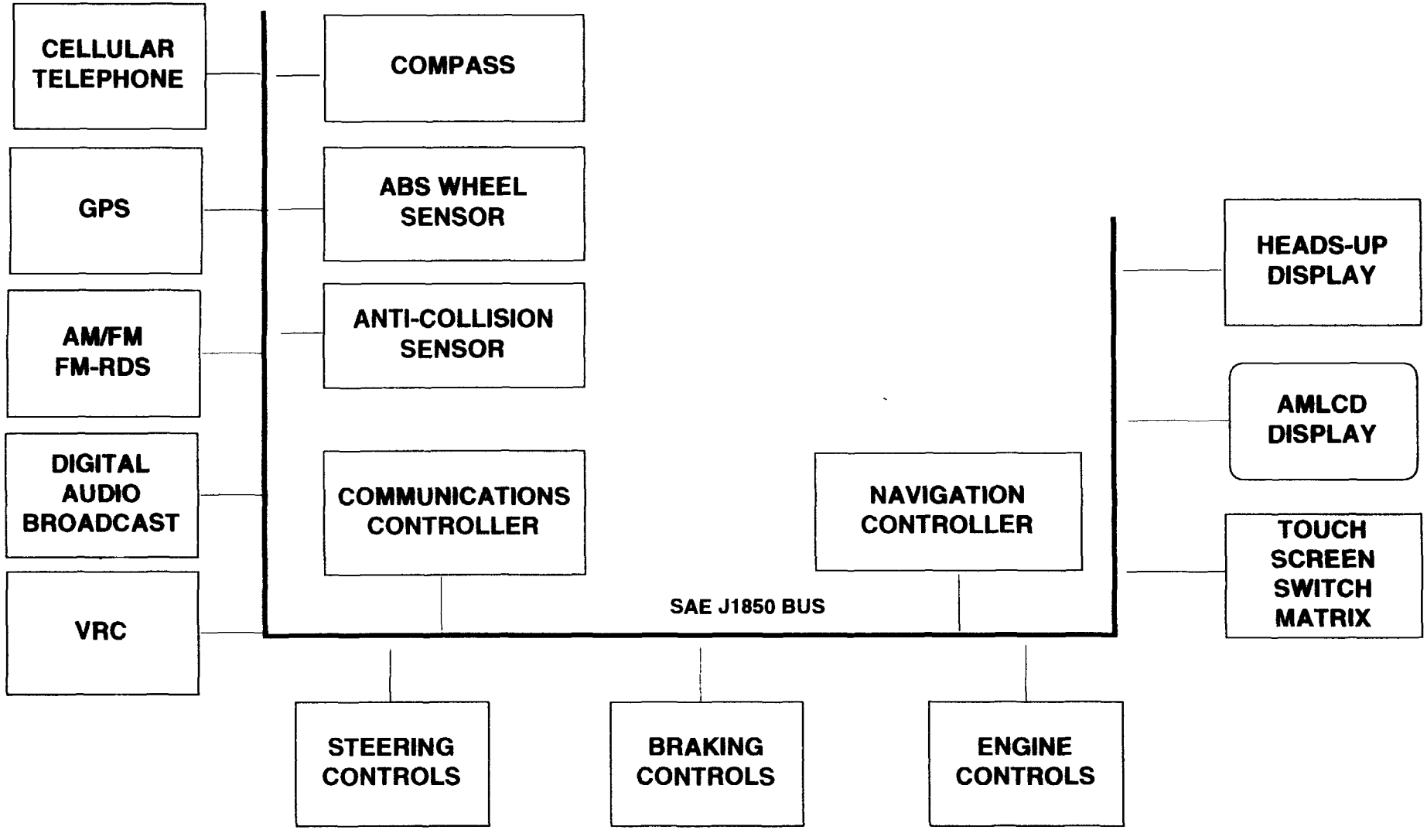
HELP Map



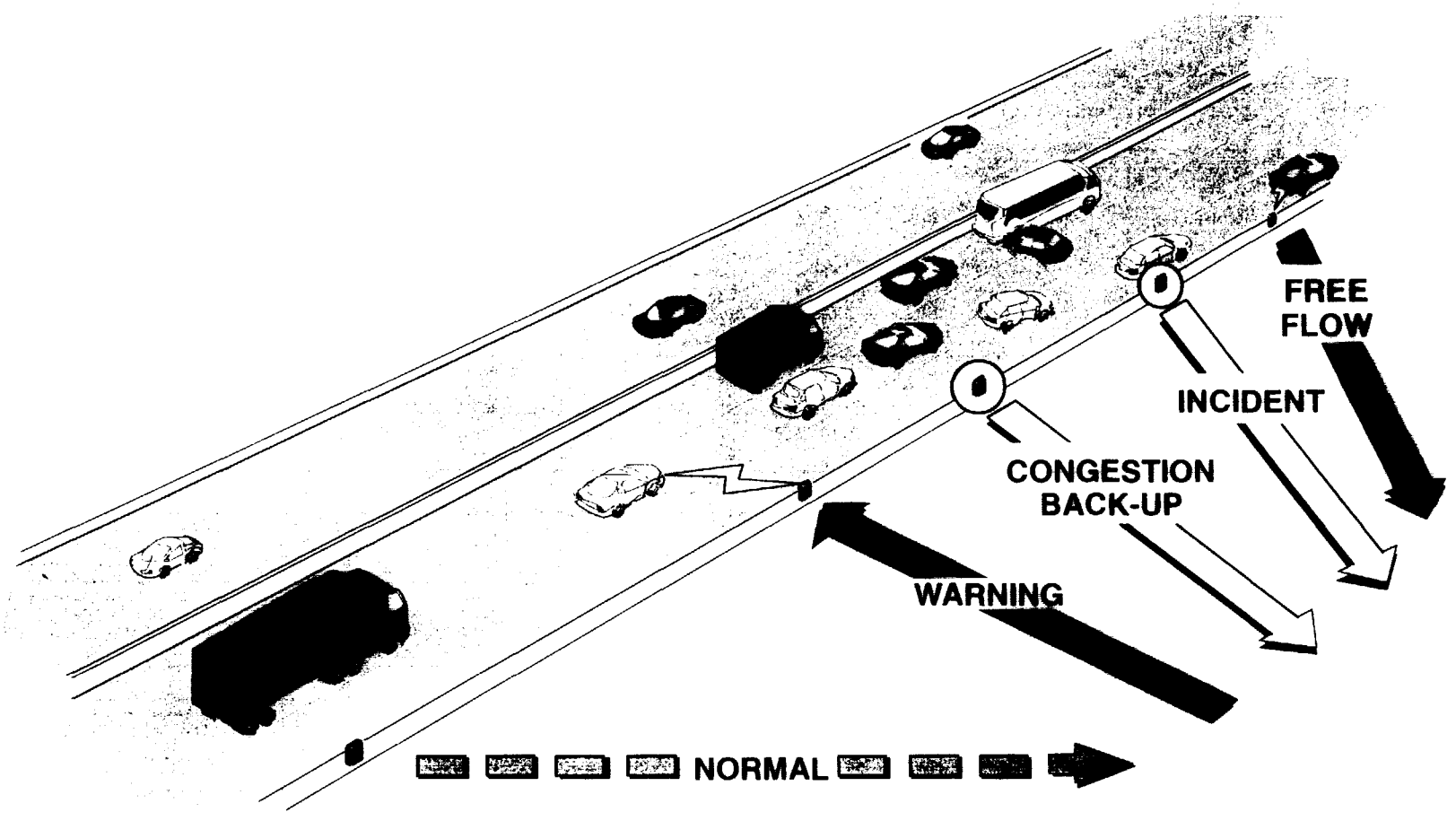
Member States and Preclearance Sites

HTMS

Integration With Vehicle Electronics



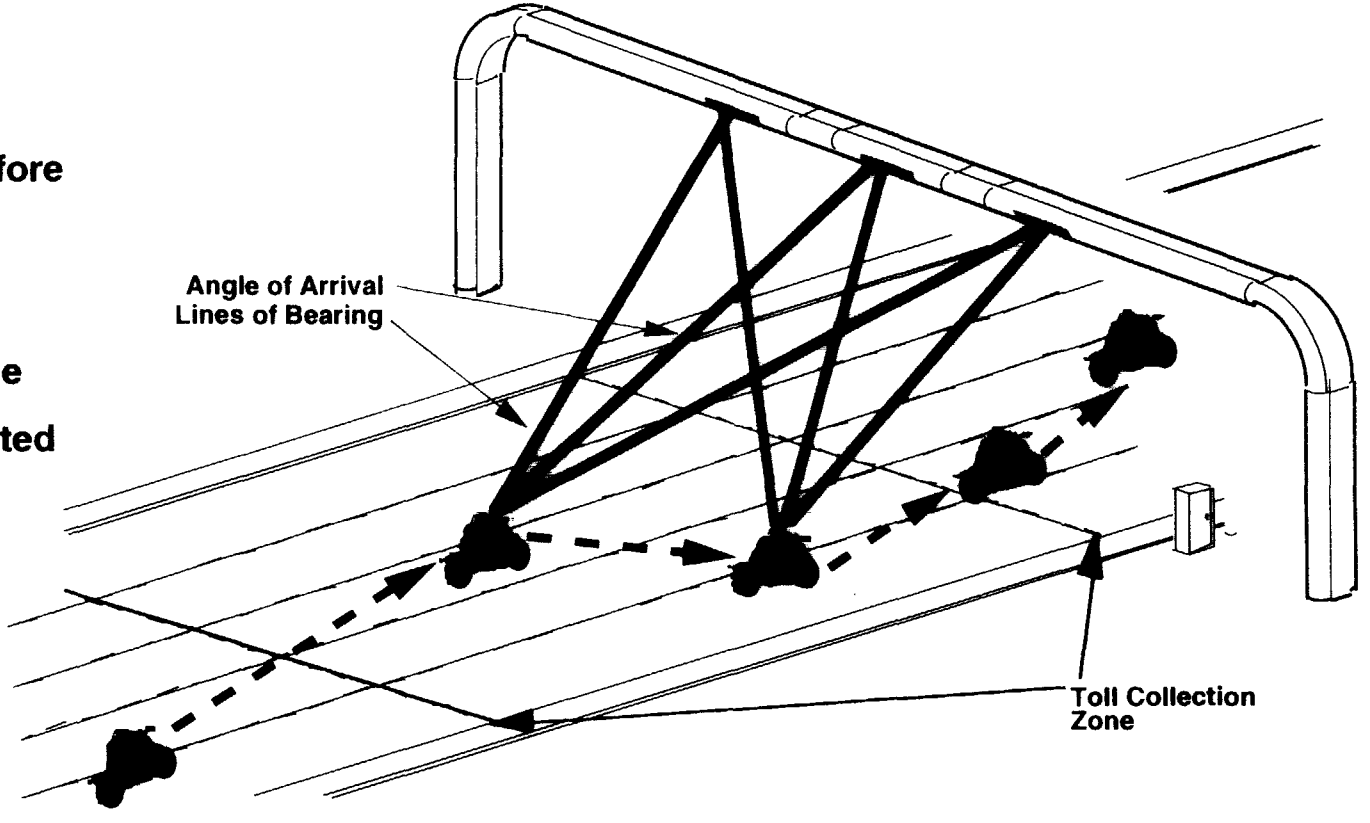
Managing The Infrastructure With VRC



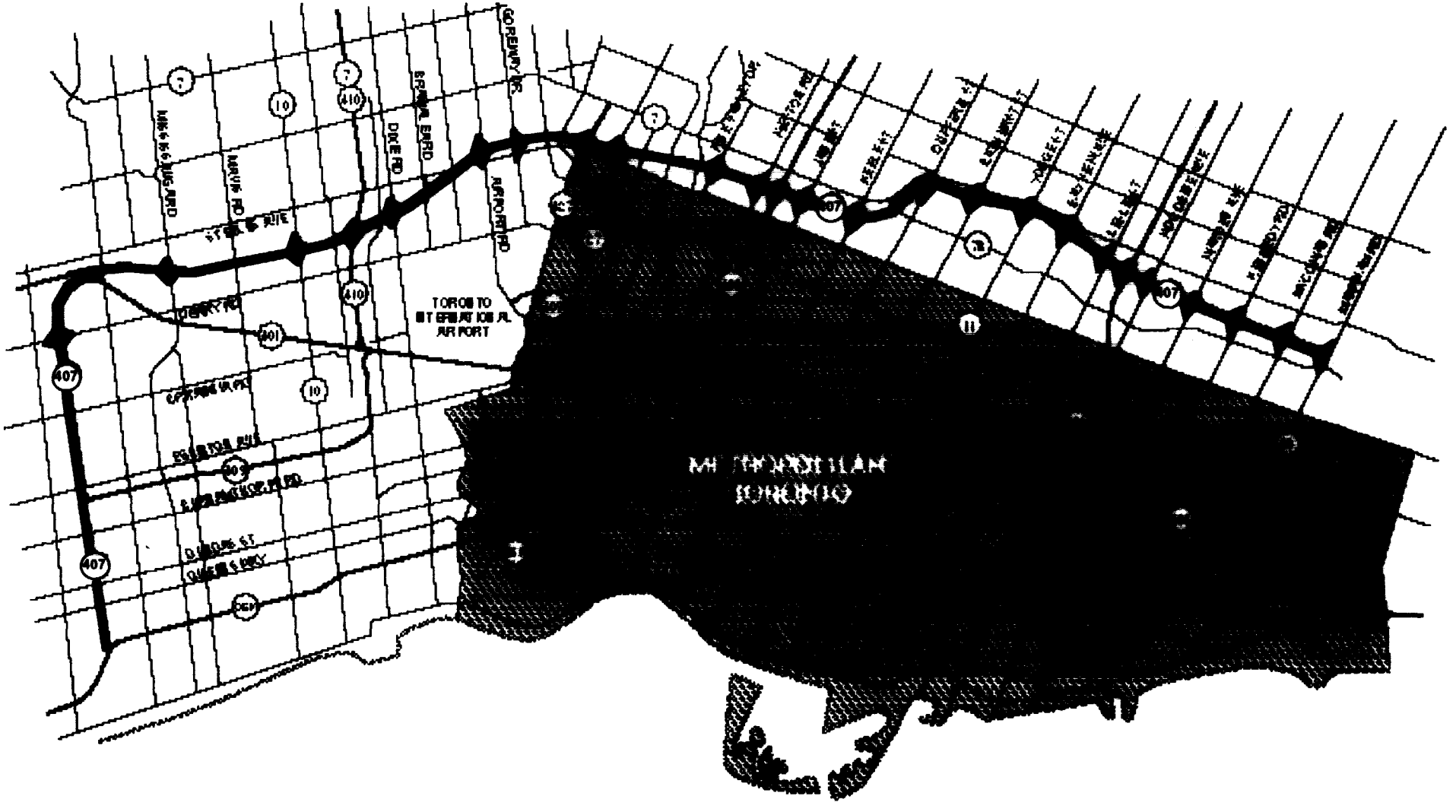
AOA Tracking of Transponders Separates Violating Vehicles From Valid Toll Vehicles

Features:

- **Transponder Tracking**
- **Unrestricted Lane Changes**
- **Direction Reversal Before Gantry Allowed**
- **Separation of Multiple Transponders (Motorcycles) in a Lane**
- **Vehicle Speed Computed**
- **Tracking of Jammers**



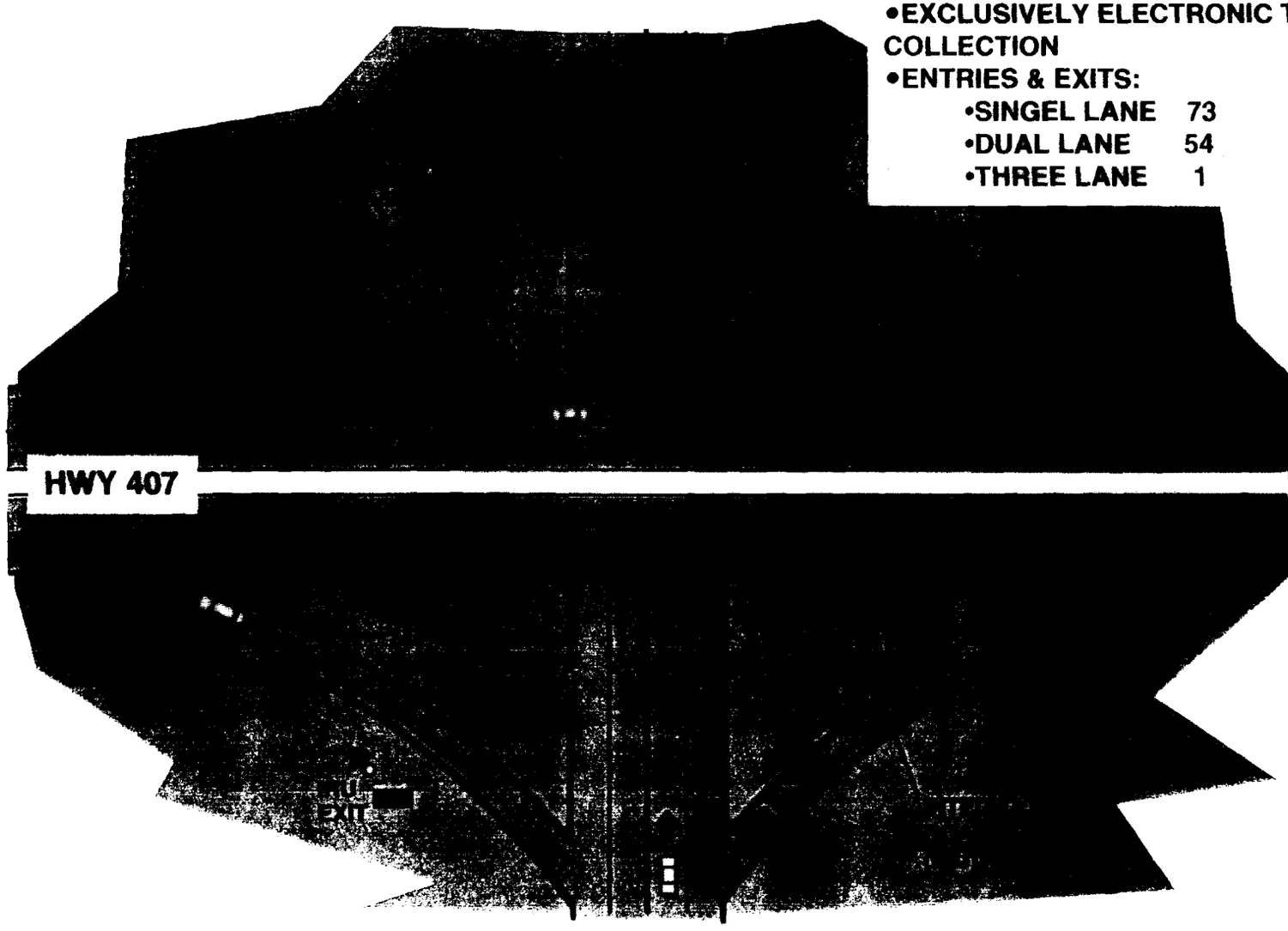
Highway 407



HTMS

Typical Interchange

- 65 km CLOSED TICKET TOLL ROAD
- EXCLUSIVELY ELECTRONIC TOLL COLLECTION
- ENTRIES & EXITS:
  - SINGEL LANE 73
  - DUAL LANE 54
  - THREE LANE 1



31116-9 (11-4-93)

HTMS

Current FTL Would Severely Impact Active NMLS

- Transponder Cost
- Compatibility with Existing Equipment
- Robustness in Crowded Band

2.5 ppm FTL Not Justified

- 2.5 ppm FTL inconsistent with NMLS bandwidths
- Emission mask protects band edge, as long as testing is complete (includes temperature and voltage).
- NMLS systems are localized
- Power and antenna height are limited

Commission Should Eliminate FTL and Rely on Emission Mask

- **Issue is Out-of-Band Emissions**

- **FTL spec supports separate testing of Spectral Rolloff and Carrier Stability. However, No Need to Separate by Rule.**

- **Rule should allow verification using direct measure of emissions vs temperature and voltage or a combination of emissions and carrier stability.**

FTL Should Not Apply to Low Power Mobile Transponders

- Transponders only communicate while in presence of reader
- Transmit Power is 2 milliwatts- 0.02% of reader
- Emissions mask still applies
- Emissions insignificant compared to reader

Alternatively, Adopt an FTL Consistent with the Bandwidth and Technology

- 2.5 ppm is applied to narrow bandwidths of 13.6 kHz (90.209(b)(5))
- This is a frequency error of 18% of the bandwidth.
- Our petition asks for 5% of the authorized bandwidth (assuming Hughes uses a 6 Mhz bandwidth)
- Result is a 0.066% FTL

Discussion of Spectral Plots

The plots illustrate several points:

1) The occupied bandwidth of the current Hughes VRC system, using the 55 + 10 log(P) rule, is 6 MHz.

2) A frequency tolerance of 10% (±5%) of the authorized bandwidth is sufficient to maintain emissions within the authorized (and allocated) bands. These small frequency offsets are nearly indistinguishable from the nominal frequency.

Figure 1 is a plot of the Hughes VRC system as currently licensed for the Advantage I-75 system. The system was licensed for a 6 MHz bandwidth authorization (less than the 12 MHz allocation in the final ruling). The plot displays frequencies from 909.75 MHz to 921.75 MHz, which is the allocation for non-multilateration systems. Tne display line at -25 dBm represents the limit for out-of-band emissions using the 55 + 10*log(P) rule. It can be seen that the Hughes system meets this rule for the 12 MHz allocation. (It is not as easy to see that the signal meets the 55 + 10*log(P) rule for a 6 MHz band centered at 915 MHz, since the plot is not centered at 915 MHz).

Figure 2 is a plot of the same VRC system with the center frequency offset by +5% of the authorized 6 MHz bandwidth (+300 kHz). Figure 3 is a plot of the same VRC system with the center frequency offset by -5% of the authorized 6 MHz bandwidth (-300 kHz). These two plots are nearly indistinguishable from Figure 1. Figure 4 is an overlay of Figures 1 and 2. Figure 5 is an overlay of Figures 1 and 3. These plots show in dramatic fashion the fact that the occupied band is nearly indistinguishable for a ± 5% (10% total) frequency accuracy. In all cases the occupied bandwidth meets the 55 + 10 log(P) rule for emissions.

Figure 1

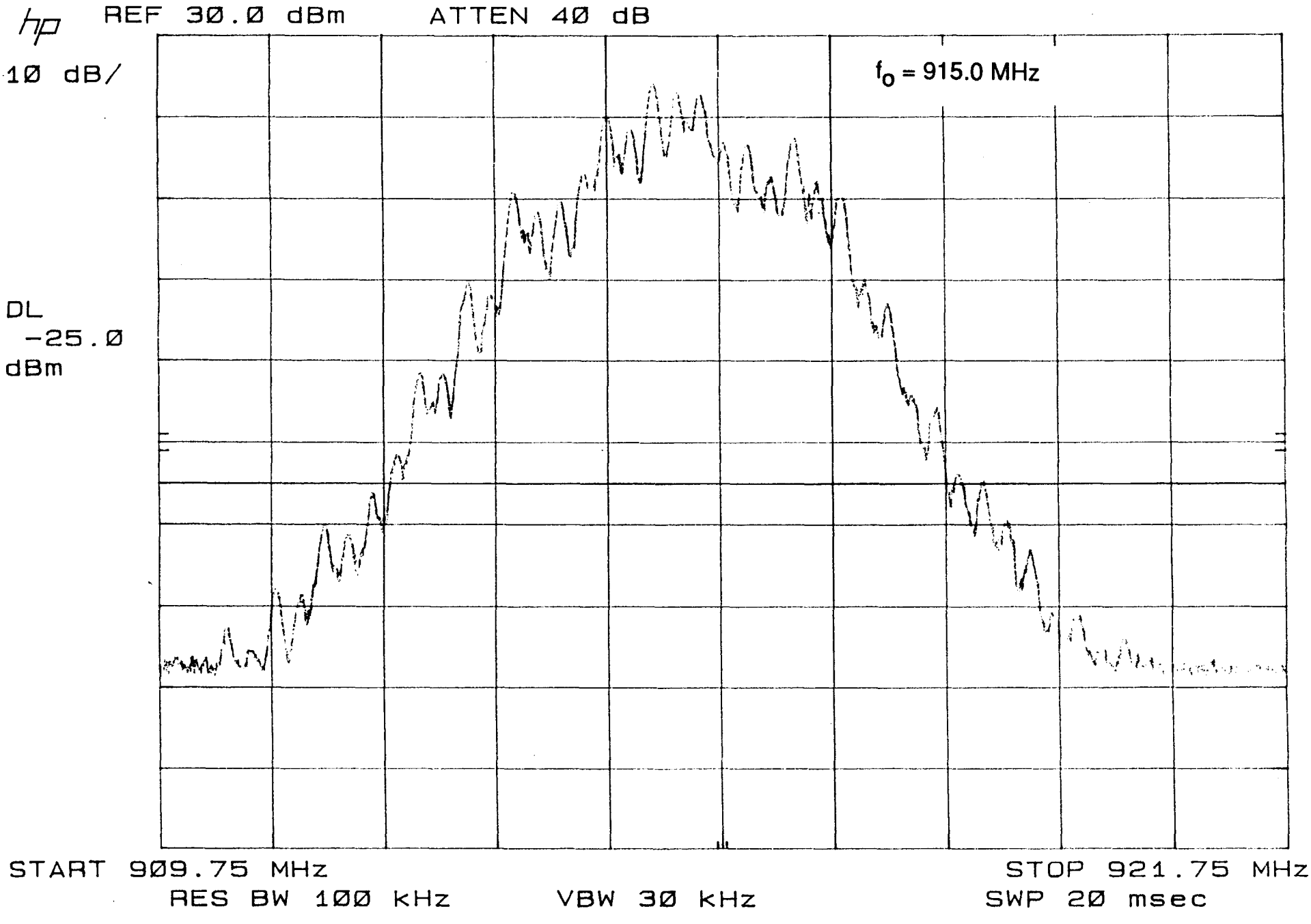

REF 30.0 dBm
ATTEN 40 dB
10 dB/
f_o = 915.0 MHz
DL
-25.0
dBm
START 909.75 MHz
STOP 921.75 MHz
RES BW 100 kHz
VBW 30 kHz
SWP 20 msec

Figure 2

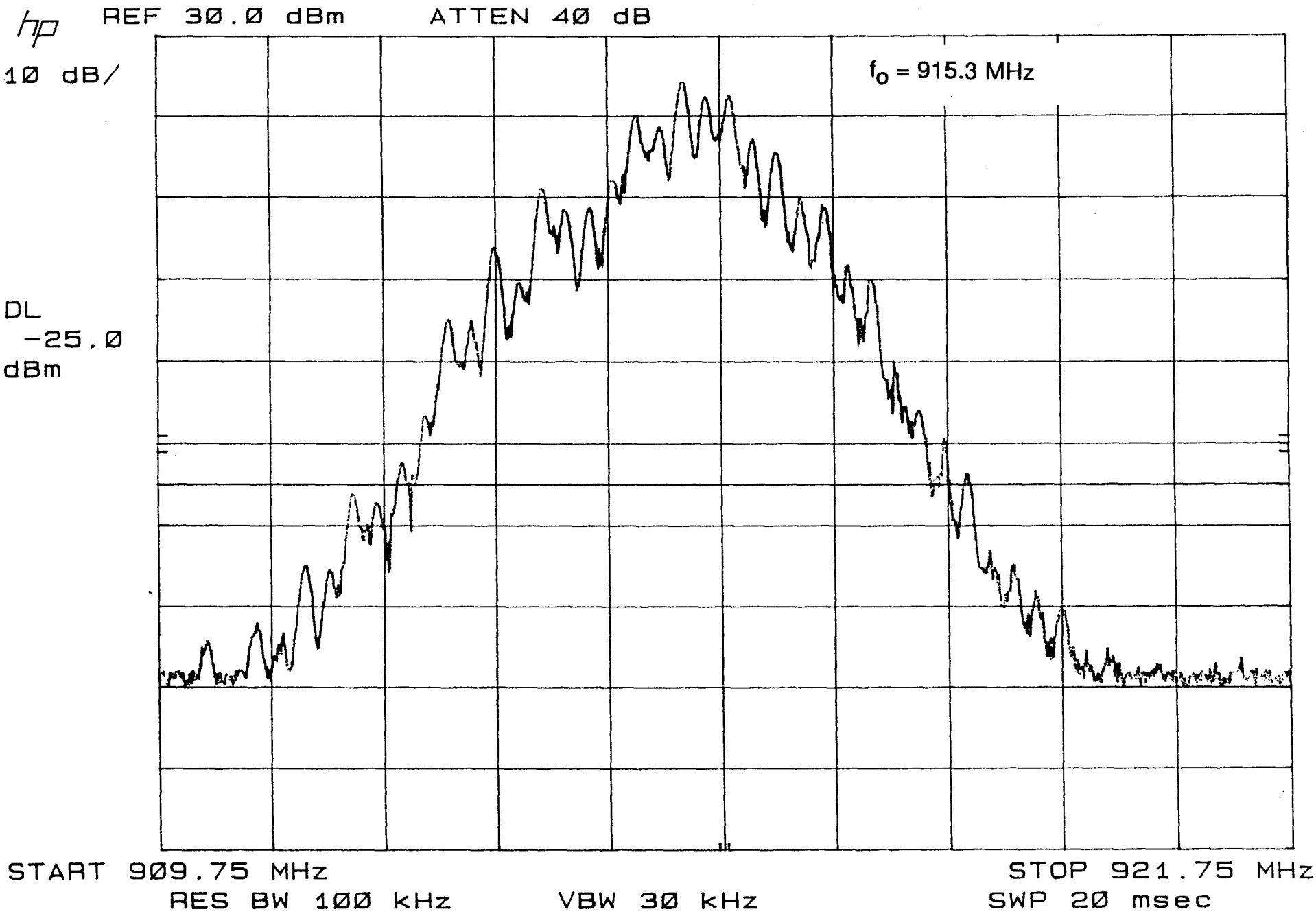

REF 30.0 dBm
ATTEN 40 dB
10 dB/
f_o = 915.3 MHz
DL
-25.0
dBm
START 909.75 MHz
STOP 921.75 MHz
RES BW 100 kHz
VBW 30 kHz
SWP 20 msec

Figure 3

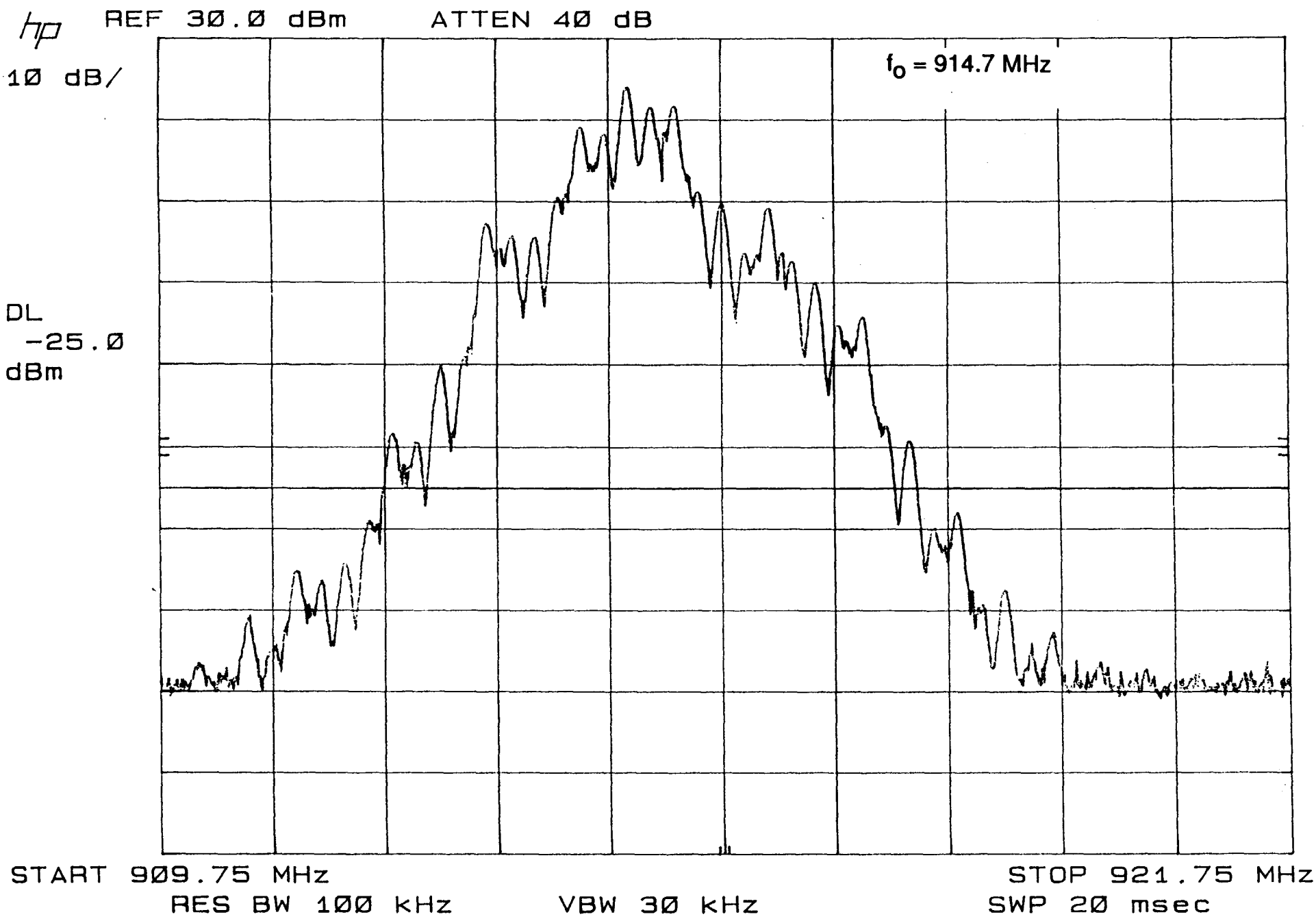

REF 30.0 dBm
ATTEN 40 dB
10 dB/
DL
-25.0
dBm
f_o = 914.7 MHz
START 909.75 MHz
STOP 921.75 MHz
RES BW 100 kHz
VBW 30 kHz
SWP 20 msec

Figure 4

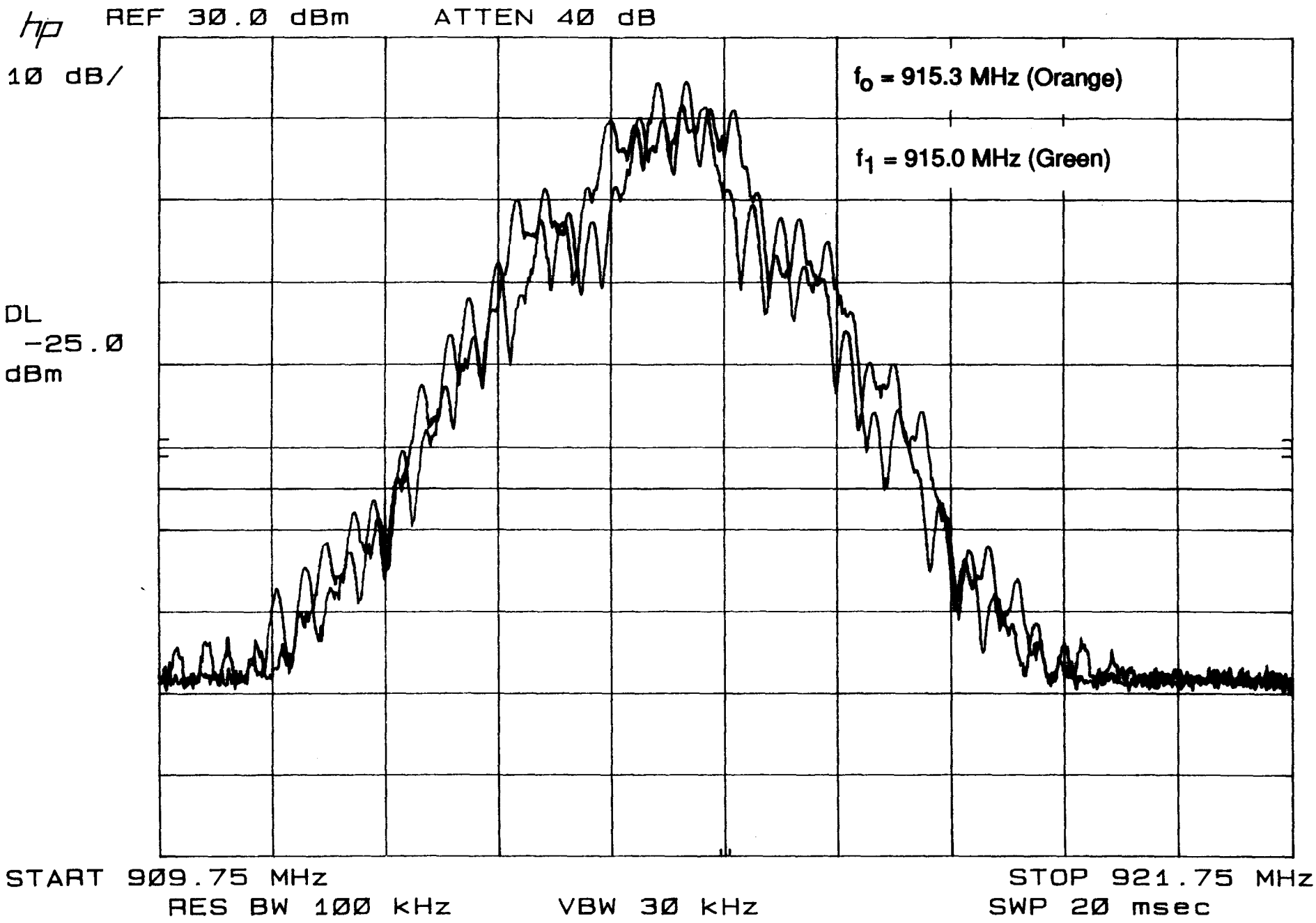
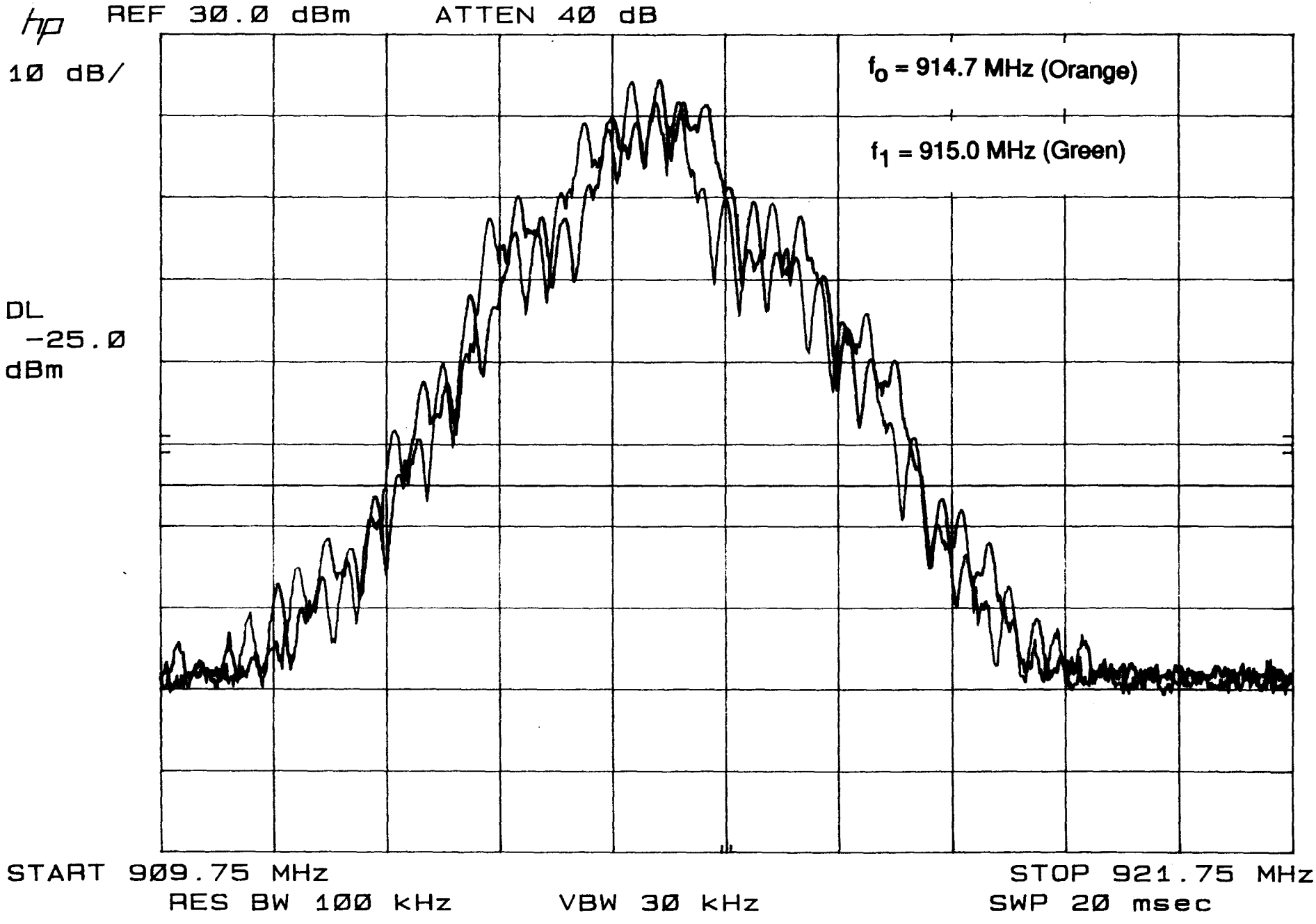

hp
REF 30.0 dBm
ATTEN 40 dB
10 dB/
DL
-25.0
dBm
f_o = 915.3 MHz (Orange)
f_1 = 915.0 MHz (Green)
START 909.75 MHz
STOP 921.75 MHz
RES BW 100 kHz
VBW 30 kHz
SWP 20 msec

Figure 5


hp
REF 30.0 dBm
ATTEN 40 dB
10 dB/
DL
-25.0
dBm
f_o = 914.7 MHz (Orange)
f_1 = 915.0 MHz (Green)
START 909.75 MHz
STOP 921.75 MHz
RES BW 100 kHz
VBW 30 kHz
SWP 20 msec